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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/987,413	11/14/2001	Yoshifumi Iida	111115	7047

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EXAMINER	
RODEE, CHRISTOPHER D	

ART UNIT	PAPER NUMBER
1756	

DATE MAILED: 06/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/987,413	Applicant(s) IIDA ET AL.	
	Examiner Christopher RoDee	Art Unit 1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 17 May 2004.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-7,9-15,18 and 19 is/are pending in the application.

4a) Of the above claim(s) 18 and 19 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-7 and 9-15 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 17 May 2004 has been entered.

Election/Restrictions

Claims 18 and 19 remain withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected method, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 5. The restriction remains FINAL for the reasons given in the Office action of 25 March 2003.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 2, 6, 7, 9-11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakashita *et al.* in US Patent 4,985,327 in view of Watanabe *et al.* in US Patent 4,956,258 and further in view of Fujii *et al.* in US Patent 4,855,204.

As discussed in the prior Office actions, Sakashita discloses a two component developer having non-magnetic toner particles and carrier particles. The toner has a specific particle size

distribution that permits the toner to faithfully reproduce thin lines in a latent image formed on a photosensitive member and excellently reproduce dot latent images, such as halftone dot and digital images. The toner provides images excellent in gradation and resolution characteristics. Further, the toner retains a high image quality even in the case of successive copying and can effect good development by using a smaller consumption (col. 4, l. 22-38). The toner has a size distribution of 17-60% by number of non-magnetic toner particles of 5 μm or smaller, 1-30% by number of non-magnetic toner particles of 8-12.7 μm, and 2.0% by volume or less of nonmagnetic toner particles of 16 μm or larger. The non-magnetic toner has a volume-average particle size of 4-10 μm, and the non-magnetic toner particles of 5 μm or smaller have a particle size distribution satisfying the following formula: N/V=-0.04N+k, wherein N denotes % by number of non-magnetic toner particles of 5 μm of smaller, V denotes % by volume of non-magnetic toner particles of 5 μm or smaller k denotes a positive number of 4.5-6.5, and N denotes a positive number of 17-60 (Abstract).

In Example 6 (cols. 25 & 26) a toner is produced from a mixture of binder resin, charge control agent, wax, and a colorant. These components are processed to give a toner having a number-average particle diameter of 7.6 μm. As seen in Table 5, the 50 % volume accumulation of particles is between 6.35 and 8.00 μm, which indicates that the volume-average particle size of the toner is in this range. Table 5 also shows that 17.2 % of toner particles by number have a size of 4.00 μm or below while 36 % by number of the toner particles have a size of 5 microns or below. This toner is mixed with hydrophobic silica having a BET specific surface area of 200 m^2/g. The reference states that a titanium dioxide having a BET specific surface area of 50 to 400 m^2/g can be used in place of the silica.

Example 7 is produced in the same manner as Example 6 except that this toner hasa different classification procedure (col. 27, l. 60). As a result, 21 % by number of particles have a size of 5 microns or below as seen in Table 6 (col. 30, bottom).

Although these examples produce a one component developer, the characteristics of the example's toner are within the scope of those disclosed by the reference as effective for either a one-component or two-component developer (col. 5, l. 4-21; col. 15, l. 45-48; & Summary of the Invention). Example 1 shows a two-component developer failing within the scope of the reference's invention having a ferrite carrier particle. The reference states ferrite powders may be treated with a resin (col. 15, l. 18-23). Example 13 shows the ferrite carrier treated with a vinylidene fluoride-tetrafluoroethylene copolymer.

The colorant of the toner can be any known dye or pigment with black, yellow, cyan, and magenta specifically recited (col. 9, l. 54-56; Examples). The colorant is contained in an amount of from 0.1 to 20 wt. parts per 100 wt. parts of the binder resin (col. 14, l. 46-53).

Sakashita does not disclose a white colorant or that the colorant is present in an amount of 20 wt. % and does not specifically state that the number of particles having a number size below 4 microns is between 6 and 16 %.

Watanabe discloses a toner having a binder resin and a colorant. The colorant is black, yellow, or white, among others. The white colorant is titanium oxide (col. 4, top). This reference shows that white is a known pigment colorant for toners and is known as an alternative in the art.

Fujii discloses a white toner containing a fixing (binder) resin and a titanium dioxide pigment dispersed in the binder as a colorant (Abstract). The titanium oxide is mixed with the binder in an amount of from 1 to 50 parts, preferably 2 to 30 parts, per 100 parts of the fixing

resin (col. 3, l. 50-53). Example 1 produces a specific toner from 20 parts of titanium dioxide, 100 parts of a styrene-acrylic resin, 2 parts of polypropylene, and 1.5 parts of a charge control agent. Fujii discloses useful triboelectric charge values in Table 4, such as values of -20.1 μC/g.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to produce the toner of Sakashita's Example 7 with less than 17 number % of particles at a size of 4 microns or less (present in Example 6) because Sakashita shows Example 7 produces a toner having an average particle size larger than Example 6 and the artisan would expect less particles in the small diameter specified size range for a toner with a larger average size. Example 6 has 17 number % of particles in the specified size range and shows that the number of particles having a size of 5 microns or less in Example 6 is 36 % while the same size range has only 21 % by number of particles in Example 7. Because Example 7 has a larger particle size than Example 6 the artisan would expect the number of particles with a size of 4 microns or less (further from the average) in Example 7 to be less than the amount in Example 6. Consequently, the artisan would optimize the number of particles in the range of 4 microns or less in Example 7 because this is a significant portion of the number of particles in the result effecting size range of 5.04 microns or less. Because Example 6 has about half the total particles below 5.04 microns in the size range below 4 microns, the artisan would have found it obvious to use a similar value for Example 7. Thus the artisan would have found it obvious to have about 10 number % of particles at or below 4 microns in Example 7 (half of 21 number %).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to produce the toner of Sakashita with a white pigment because Sakashita indicates that known colorants can be used and Watanabe discloses white pigments as known

colorants for toner particles. The type and colors of the colorants overlap in Sakashita and Watanabe indicating that they are known alternatives depending on the color desired for the toner. Further Fujii strengthens the proposed combination of references by disclosing a specific white toner mixed with a ferrite carrier (Example I) and treated with hydrophobic silica. This reference shows specific features pertinent to the formulation of white toners, such as useful charging amounts and addition amounts of white pigments. Use of such charge amounts would have been obvious in order to form a white toner effective with carrier particles. Given the totality of the evidence, the artisan would have found production of a white toner obvious in Sakashita since such toners and their characteristics are well known in the art where a white image is being formed.

This new ground of rejection fully responds to applicant's remarks in the recent request for reconsideration because the art suggests that the number of particles in the size of 5.04 microns or less should be optimized and because Sakashita provides guidance of useful numbers of particles having a size of both 5.04 microns or less and 4 microns or less to obtain the results of the invention.

The evidence of record is not persuasive to overcome the rejection for the reasons given in the previous Final Office action because the deficiencies of the data relate to the tests used to show the results of the invention. Such deficiencies are not remedied by the claim amendments because the amendments do not relate to problems noted in the test procedure (i.e., the criticisms were unrelated to the number of white toner particles in the specified size range). Similarly, the evidence is not persuasive because it is not commensurate in scope with the claims because only plural overlay images are presented, but the claims still recite only a single toner. See Final pages 3-5.

Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakashita *et al.* in US Patent 4,985,327 in view of Watanabe *et al.* in US Patent 4,956,258 and further in view of Fujii *et al.* in US Patent 4,855,204 as applied to claims 1, 2, 6, 7, 9-11, and 13 above, and further in view of Iida *et al.* in US Patent 5,922,500.

Sakashita, Watanabe, and Fujii were discussed above. Sakashita does not disclose the specifics of the hydrophobic titanium oxide, but Iida discloses hydrophobic titanium dioxide additives for toners that have improved fluidity characteristics. The titanium oxide has a specific surface area of from 100 to 350 m^2/g (col. 6, l. 52-54). Binders for the toner include styrene/acrylates (col. 11, l. 10-11). Production Example 1 shows that $TiO(OH)_2$ is reacted with a hydrophobicizing silane in order to produce hydrophobic titanium oxide particles with a BET specific surface area of 180 m^2/g. Also note Production Example 3 that forms hydrophobic titanium oxide by a similar process and has a specific surface area of 130 m^2/g.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the exemplified titanium oxides disclosed by Iida in the invention of Sakashita because Iida discloses a method of making the hydrophobic titanium oxides as external toner additives which are called for by Sakashita. Iida discloses that the titanium oxides of that invention solve prior art problems of fluidity, charging, abrasive character, and environmental stability. Stable charging and environmental characteristics are disclosed as a concern in Sakashita so the artisan would have ample motivation to look to Iida to aid in solving these concerns.

Claims 5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakashita *et al.* in US Patent 4,985,327 in view of Watanabe *et al.* in US Patent 4,956,258 and further in view of Fujii *et al.* in US Patent 4,855,204 as applied to claims 1, 2, 6, 7, 9-11, and 13

above, and further in view of *Handbook of Imaging Materials* to Diamond, pp. 179-181 & 222-224.

Sakashita, Watanabe, and Fujii were discussed above. Sakashita does not disclose the resistivity of the ferrite carrier, but Diamond states that ferrites having resistivities of from 10^7 - 10^{11} are within the range of current interest (see Figure 5.11). Further Diamond discloses that typical toner charging is within the range of 10 to 30 μC/g for 10 μm toners (p. 180).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to produce the ferrite of Sakashita with a resistivity between 10^7 - 10^{11} because Diamond teaches that this range is of current scientific interest and the artisan would have been expected to optimize the resistivity in Sakashita to values within the disclosed range (such as at the midpoint of 10^9) in order to produce an effective carrier at a known effective resistivity. Further, the artisan would have found it obvious to optimize the toner charge, such as near the specifically recited 30 μC/g in Diamond because Diamond states that this is a typical charging amount for toner particles having size of about 10 μm.

Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakashita *et al.* in US Patent 4,985,327 in view of Watanabe *et al.* in US Patent 4,956,258 and further in view of Fujii *et al.* in US Patent 4,855,204 as applied to claims 1, 2, 6, 7, 9-11, and 13 above, and further in view of Vail in US Patent 5,994,015.

As discussed above, the combination of Sakashita, Watanabe, and Fujii suggests a white toner having a binder resin and white colorant in the specified amounts as well as the particle size characteristics required of the claims. The combined references also suggest and exemplify preparation of a developer by combining the toner with a fluororesin coated carrier.

The references do not disclose a fluororesin containing an electrically conductive particle dispersed therein for the carrier resin coating.

Vail discloses a carrier for a two-component developer that has a core **11** coated with a first conductive layer **12**. This conductive layer is comprised of fluoropolymer (col. 4, l. 10-39) and conductive particles **14**, such as carbon black (col. 4, l. 1). A second outer coating layer is deposited over the first conductive layer.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the carrier of Vail with the toner of the combination of Sakashita, Watanabe, and Fujii for formation of a two-component developer because Sakashita exemplfiies the formation of a developer that contains a fluororesin coated ferrite carrier and Vail discloses a carrier that provides improved image resolution, particularly solid area images, while providing the requisite charge to the toner (Vail: col. 2, l. 54-67).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher RoDee whose telephone number is 571-272-1388. The examiner can normally be reached on most weekdays from 6:00 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

cdr
15 June 2004

CHRISTOPHER RODEE
PRIMARY EXAMINER